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Network based determinants of innovation performance in yacht building clusters*

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Abstract

This paper presents the preliminary findings of a larger study that will analyze the network based determinants of innovation performance in clusters through an empirical study on the business networks of yacht building firms clustered in certain regions of Turkey. The findings of this research will specifically address the research gap in the literature on the determinants of the innovativeness and competitiveness of yacht building firms, and also contribute to the discussion on the structural characteristics and innovativeness of the knowledge sharing networks of industrial clusters. The findings of this study portrays the profile of the yacht building cluster situated in the Antalya Free Zone (AFZ), the institutional factors affecting these firms; the intellectual capital resources of firms, the structure of their networks at local, national and global levels; the relational capital they have created within their clusters, and the impact of these factors on the innovation and business performance of firms. The yacht building firms in the sample scored quite high in intellectual capital and innovativeness, relatively low in innovation performance, somewhat modest in relational capital, supporting institutional environment and total satisfaction with performance. The findings of the network analysis demonstrated that the Zone firms relied heavily on national and global networks as information sources and strategic alliances. Global and national suppliers and service providers established a high majority of total networks in those categories. The only category that showed prominence in local networks was the outsourcing firms in the region.

Keywords: Innovation performance, business networks, clusters, relational capital, yacht building sector

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1. Introduction

This paper presents the preliminary findings of a larger study that will analyze the network based determinants of innovation performance in clusters through an empirical study on the business networks

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of yacht building firms clustered in certain regions of Turkey. The eventual study will portray the profile of all yacht building clusters in which these firms are embedded and the institutional factors affecting them; the intellectual capital resources of firms, the structure of their networks at local, national and global levels; the relational capital they have created within their clusters, and the impact of these factors on the innovation and business performance of firms will be analyzed. This paper reports the results the findings of the pilot field study conducted on 16 firms of the yacht building cluster situated in the Antalya Free Zone (AFZ) the yacht building firms of which has currently gained prominence among others. This preliminary study has given the chance to check the reliability of the data collection tools, to make the final corrections on the questionnaire, and to use the available data to make some predictions regarding the final hypotheses and research model of the study.

2. Theoretical background

This research project will make use of theoretical work dealing with the innovative performance of cluster firms embedded in multi-level business and information sharing networks. This topic rests on the intersection of scholarly work on clusters, innovation, knowledge-based view of the firm, relational capital, intellectual capital and institutional systems approach. The origins of clustering research date back to the work of Adam Smith [1] and Alfred Marshall [2] who inspired many economists and management scholars to explore the dynamics of agglomeration [3]. Paul Krugman [4], Anne Lee Saxenian [5] and Michael Porter [6], [7], [8] were the forerunners of different research tracks conducted in various industries all over the world [9], [10], [11]. Clustering or agglomeration research has focused on two different research questions, one related with the geographical co-location of firms from different industries and the other with the geographical clustering of firms from the same or related industries. Marshall [2] was the first economist to emphasize the supply and demand based factors (access to specialized labor, specialized inputs, technology spillovers and access to higher demand) enjoyed by firms locating in the same region. Empirical findings of many different studies confirmed these externalities, and demonstrated that clusters improved efficiency, innovation and competitiveness in different ways [12].

The impact of clustering on knowledge and technology transfer and innovativeness has become an important research track of knowledge management researchers. Studies that explore the knowledge transfer and technology spillovers in industrial clusters [13], [14], [15], [16], [17], [18], [19] and the more specific work on knowledge-based theory of the firm [20], [21], [22], [23], [24] developed the idea that the real competitive power of firms depends on their capacity to access information and create knowledge. Hence the concept of ‘social embeddedness’ forwarded by Granovetter [25] became a key issue in studying the impact of relationship networks on innovativeness and performance.

The concept of ‘social capital’ developed by Coleman [26] suggests that economic activity and performance of firms should be analyzed within the social networks they are embedded in. Findings of the study by Uzzi [27] based on the concept of ‘structural embeddedness’ demonstrated that the chance of survival of firms that succeed in combining embedded (strong) linkages with arms-length (weak) linkages in their relationship networks was the greatest. This study proved that embeddedness provides positive returns only up to a certain level beyond which negative returns start being generated. This finding indicates the importance of investigating the arms-length linkages of firms besides embedded links as also suggested by the concept of “strength of weak ties” proposed by Granovetter [28]. A number of academic works have emphasized access to new knowledge as the most important direct benefit of social capital [29], [30]. In their theoretical work on the intersection of social capital, networks and technology transfer, Inkpen and Tsang [31] discuss how the networks provide access to knowledge, markets and technologies for firms. Three types of networks discussed in this study are, intra-firm networks, strategic alliances and

industrial districts, where strategic alliances represent strong network ties relying on repetitive transactions and multiple knowledge interfaces, and industrial districts represent weak ties relying on physical proximity.

The empirical work by Molina-Morales & Martinez-Fernandez [32] demonstrated that the level of innovation realized by firms in an industrial district was related to the relational capital developed in that region. Relational capital depends on cooperation with suppliers and customers and relationships with other firms. The mobility of human resources in the region, shared vision and cooperation based on trust are taken as the indicators of relational capital. Kale et al. [33] also propose that relational capital based on trust allows greater exchange of information and know-how between parties, in accordance with the findings of earlier work by Nahapiet & Ghoshal [30], Krugman [4] and Saxenian [5], all of whom indicated the importance of measuring relational capital in industrial clusters.

Clustering literature also indicates the important role government policies can play in the development of industrial clusters and in the transfer of technology between clusters [34]. Institutional supports for sustainance of training, finance and new technologies helps in reducing risks related with adopting new technologies [35], [36]. The importance of inquiring the institutional context on the innovation performance was forwarded by the scholars of institutional systems approach [37], [38].

While the early clustering research has emphasized the benefits the cluster firms enjoy from geographical proximity [4], [6], [7], [8], [5] more recent work [39], [40], [41], [42], though confirming the importance of local linkages for knowledge spillovers, technology transfers and innovativeness, demonstrate the significance of global linkages. Empirical work and observations on the development of industrial clusters for more than 20 years have led scholars to widely criticize the emphasis on internal dynamics and resources, and to direct attention to the global cooperation and knowledge transfers among different types of networks and value chains. Overall conclusion to be drawn from the recent studies can be summarized as the necessity of considering the multi level network ties while analyzing the innovativeness, relational capital and embeddedness of cluster firms.

3. Research hypotheses

Motivated by the recent findings of the relevant literature, the authors found it as a worthwhile research topic to inquire the structural properties (number and strength) of in-cluster (local) and out-of-cluster (national and global) knowledge sharing networks of firms operating in the yacht building clusters which are by nature linked to external markets with respect to their inputs and outputs, and to relate these properties with the innovativeness and performance of cluster firms. One of the questions to be explored is whether the firms embedded in more developed clusters demonstrate higher innovativeness and performance than firms embedded in less developed clusters, as indicated by the early clustering literature. It is expected that, the more developed the cluster properties the higher will be the innovativeness and performance of firms that benefit from higher economies of scale and scope (H1). In accordance with the concept of ‘structural embeddedness’ developed by Uzzi [27] this study will investigate the total size of the relationship networks of yacht building firms, and more specifically question their strength by asking the number of (local, national and global) relations perceived as a source of information and also relations perceived as a strategic alliance. It is hypothesized that the total size of the knowledge sharing networks perceived as source of information will have a positive impact on their innovativeness (H2). It is also hypothesized that the total size of their global linkages will have a positive impact on their innovativeness (H3) as indicated by the findings of studies by Armatlı-Köroğlu [39] and Eraydın and Armatlı-Köroğlu [41]. The study will also inquire in which functional areas and with what linkage strength the in-cluster (local) and out-of-cluster (national and global) relations are conducted.

Relying on the findings of the previous studies of the current authors [43], [44], [45] it is hypothesized that strong in-cluster relations will predominantly be with the outsourcing firms (H4) and service providers (H5), while the global strong relations will predominantly be with the suppliers (H6) and marketing actors (H7).

According to the resource based view [46], [47], [48], [49] forming the second base of this study, firm innovativeness is related with the intellectual capital possessed by firms [50], [51], [52]. Therefore another hypothesis was formulated to test the proposed positive relationship between innovativeness of firms and their intellectual capital (H8). The third base of the study requires the exploration of the institutional environment of the firms. The innovation systems approach [38] which carries a lot in common with the network approach to innovation, but which puts greater emphasis on the holistic and universal nature and the complex web of interactions of innovation, and the institutional environment that directs and facilitates the actions and interactions of economic actors, recommends the evaluation of the institutional environment. Therefore in this project, the supporting institutional environment of the yacht building firms will be evaluated through semi structured interviews with the directors of these firms and also the directors of the related public, private and non-governmental organizations. In these interviews actors like the local governments, trade associations, NGO's, free trade zone directorates and operators, financial institutions and the regulations etc., all who have the capacity to affect yacht building clusters will be evaluated with respect to their supporting power. A positive relationship is expected between powerful supporting institutional environment and innovativeness (H9). Additionally, a positive relation is hypothesized between the global linkages of firms serving external markets and firm innovativeness (H10). Finally, it will also be questioned whether there is a positive relationship between the innovativeness and general performance of firms (H11) as suggested by the relevant literature [53], [54].

4. Method

4.1. Universe of the study

According to the sector report issued by the Turkish Ministry of Transportation in 2010, Turkey ranks as the fifth country receiving yacht orders in the world with a share of 9% [55]. The total number of registered yacht builders is 360 (62 in İstanbul, 48 in Antalya, 48 in İzmir, 44 in Marmaris, 25 in Fethiye, 41 in Bodrum, 45 in Black Sea Region, and 47 in other places [56]. In accordance with the objectives of the study, the yacht building firms located in Tuzla, Antalya, İzmir, Bodrum and Marmaris where this sector shows a tendency for clustering, and also firms in Fethiye, Bursa and Yalova, where there is a significant progress in yacht production though not clustering, will be included in the universe of the scope of the study. Appointments for semi structured interviews will be made with the top level managers of the yacht building firms in these locations and the structured questionnaire developed by the researchers will be administered to the same managers. The authors will also seek opportunities for conducting semi structured interviews with the directors of the relevant public authorities and non governmental organizations that have a potential impact on these clusters.

4.2. Sample of the study

The pilot study of this research project was conducted in Antalya, on the yacht building firms situated in the Free Zone, where there are 31 licensed firms for yacht building. The authors were able to interview one manager (general manager, owner manager, general coordinator, shipyard manager, technical coordinator, engineering chief and assistant general manager) of 16 (out of 24 active) firms who are responsible for 90% of total yacht exports from the region. The structured questionnaire of the study was administered during the interview, the clarity of the questions was checked and minor modifications were

made to improve the sectoral validity of the questions. The interviews were conducted by two members of the research team, semi-structured interview questions were directed first, the interviews were tape recorded to be transcripted later, and the structured questionnaires were filled face to face, giving chance for further explanations.

4.3. Data collection tool

The structured questionnaire of the study was prepared by the authors basing on the objectives of the study. It was composed of 7 parts, the 1st pertaining to some relevant information about the firm; the 2nd pertaining to the innovation performance (scale adapted to the sector from the study by Varis & Littunen [38]) and the innovativeness of the firm (scale adapted from the study by Calantone et al. [57]), the third pertaining to the intellectual capital of the firm (scale adapted from the study by Kianto et al. [58]) the fourth pertaining to the relational capital of the yacht building cluster (scale adapted to the sector from the study by Molina-Morales & Martinez-Fernandez [32]); the fifth pertaining to the local, national and global linkages in the knowledge sharing networks of the firms (scale developed by the authors); the sixth pertaining to the satisfaction with the performance of the firms (scale adapted from the study by Venkatraman [59]) and the seventh pertaining to some demographic information about the person interviewed. The interview transcripts were content analyzed regarding the objectives of the study; the questionnaires were coded and descriptive statistics were analyzed to report the findings summarized below.

5. Findings

5.1. Sample profile

Sixteen (16) firms included in the pilot study of the research project, comprising both the first and the last firms coming to the Zone, were founded between the years 2001-2010. Ten (10) firms are domestic while four (4) of the remaining are foreign capital owned and two (2) are partnerships of Turkish and foreign investors. All the firms in the sample can be classified as SME's, 2 of them micro in size (less than 10 employees), 8 small (with 10-49 employees) and only 6 medium sized (50-250 employees). Six (6) of the firms are affiliate/branch of firms headquartered out of Antalya, 2 of which are in foreign countries. Only four (4) of the firms are exclusively engaged in yacht building, while six (6) are doing both yacht building and yacht repair and refitting, one (1) engages in contracting business besides yacht building, and the remaining five (5) have defined their businesses in more than two areas, including contracting, yacht decoration and slipway operation. This profile reflects the crisis management solutions the Zone firms have developed to survive the hard days of the recent global economic crisis. Especially yacht repair and refit business was mentioned as a very promising and profitable business opportunity for the Zone, if the current difficulties due to the infrastructural inconveniences of the quay and slipway can be resolved.

The dominant product type of the region is motor boat sized between 12m and 50m, although production of smaller boats is also kept as an option and one firm has started a project bigger than 60m. Among 16 firms only 6 firms have built boats smaller than 18m. (115 boats) and 8 firms have specialized in motorboats sized between 25-50m. Besides these, two (2) firms are also engaged in military boat projects. Twelve (12) firms have registered brand names for their products. Others build yachts/boats according to customer specifications. The total number of boats built by 15 firms (one firm founded in 2010 excluded) in the sample between 2001 and 2010 totals 171 representing 90% of all boats exported from the region. This represents majority of the boat building experience accumulated in the region. 67% of the boats sold were sized between 6 to 18m., maximum size reaching 46.5m. Eighty (80) percent of

boats/ yachts sold had a CE or class certification. Currently 23 boats are under construction in the shipyards. Only one firm declared to possess 4 patented innovations.

The production technology of the firms in the zone can be classified according to the materials used in boat building. The findings indicate that some firms (5) only use composite (5), one (1) uses composite and wood, two others (2) use composite-wood and steel or aluminum and steel (2), some others (3) use composite-aluminum and steel or composite-aluminum-steel-wood (2), or aluminum-steel and wood (1). During the interviews it was pointed out by several respondent managers that the firms in the zone were generally specialized in composite production which represents more recent technology especially in mega yacht building for which AFZ yacht building firms have made a reputation. Composite material based manufacturing is used either on its own or in partial combination with materials like wood and steel. This profile indicates that the firms in the region generally try to combine competencies in working with different materials.

5.2. Dependent variable 1: Innovation performance

The innovation performance scale was adapted by the authors from the scale used by Varis & Littunen [38] in depicting the introduction of an innovation (product, process, market or organization) by the entrepreneurial SME's included in their sample. The authors in this study prepared question items on the four types of innovation, inquiring the degree of novelty introduced on a 5-response scale, namely, completely new, radical modification or improvement, modification on the existing, minor alteration, and no modifications alternatives. This gave the chance to the respondents to save their face by choosing the "modification on the existing" alternative if there was no real innovation to be declared. In evaluating the results only the first two responses were accepted as an innovation introduced during the four year period prior to data collection. The authors of the present study adopted the same approach to develop a special scale for the yacht building sector with twelve items, two for product, four for process, three for marketing and three for organization innovations. The respondents were asked to reply for each item the degree of novelty introduced on the 5- response scale explained above. And in evaluating the results, only the first two responses were accepted as an innovation, and the firm was given a score of one for each innovation area (product, process, marketing and organization) if there was at least one item checked in that category. The other responses were coded as no innovation. The firms were given a score out of 4, depending on the number of accepted innovations for each category. The findings of the study demonstrate that the average innovation score of 15 firms (one recently founded firm was excluded from data) in the pilot study is 2.13±1.19 (firms ranging between 0 and 4): Nine (60%) firms achieved product innovation, nine (60%) firms achieved process innovation, seven firms (46%) achieved marketing innovation and seven firms (46%) achieved organization innovation. These results demonstrate a mediocre level of innovation performance in the Zone, for the last three years, which comprises the worst period of the world recession.

5.3. Dependent variable 2: Business performance

As the innovation literature assumes a positive relationship between innovation and performance, another dependent variable measuring certain performance dimensions relevant for the sector was used to evaluate performance. The scale was adapted from the subjective performance evaluation scale developed by Venkatraman [59]. The findings indicate that the total satisfaction with 8 criteria inquired in the study had an average rating of 3.15±0.71 out of a 5 category response scale (not satisfactory to very satisfactory). The criteria that received the lowest ratings were the profit margin 2.43±1.08; and orders received 2.50±1.28; those that received the highest ratings were customer satisfaction 4.21±0.57 and firm reputation 3.80±1.01. Satisfaction of respondent managers with the general performance of the firm was

higher than the total satisfaction score (3.73±0.88). These results indicate a medium level of performance among the firms, which is not surprising, considering the detrimental effects of the recent world recession on the yacht building sector.

5.4. Independent variable 1: Degree of clustering in the region

The authors of the present study planned to evaluate the degree of clustering in the yacht building regions in Turkey by employing several measures like: 1) a scale of relational capital; 2) cluster age; 3) cluster size; 4) average number of total local business/knowledge sharing linkages used by the firms in the region. These measures are in conformity with the cluster theory which assumes that as industrial regions get older, they get bigger in size and develop a lot of linkages among suppliers, contractors and customers in the region giving rise to higher relational capital. Three categories of clustering degree (low-medium-high) will be created depending on the results of these measures. In the eventual research project this measure will enable the researchers to compare different yacht building regions with each other to test some assumptions of the cluster theory. H1 hypothesizes that the more developed the cluster properties the higher will be the innovativeness and performance of firms that benefit from higher economies of scale and scope.

For the present study, since a comparative interpretation is not possible, a description of the cluster under study will be provided. The AFZ yacht building cluster is only 10 years old, and the cluster size is 52 including all the registered/licensed yacht building and related industry firms in the Zone. When revised with regard to the total number actually in business this number reduces to 45, 24 of which are engaged in yacht building. As will be seen in Exhibit 1 the average number of total local business linkages carried out by the 16 yacht building firms is 40.20 establishing 19% of total network linkages indicated by the same firms. This ratio is even lower (17%) for local strategic alliances among the total strategic alliances declared. 87 percent of suppliers and 81 percent of service providers are either national or global players. Only the local outsourcing contractors comprise 62 % of its category. These findings indicate that the yacht building firms are able to meet only their outsourcing needs from local actors, which are often not accepted as strategic alliances. Taken together these results suggest the existence of a medium level of cluster development in the Zone.

5.5. Independent variable 2: Relational capital

As a predictor of the first independent variable, the relational capital of the region was measured by a scale adapted to the sector by the authors from the one used by Molina-Morales & Martinez-Fernandez in their study which [32] demonstrated that the level of innovation realized by firms in an industrial district was related to the relational capital developed in that region. In our sample, the average overall relational capital score of the 16 yacht building firms was 3.32±0.57 on a 5-point Likert scale, indicating a mediocre degree of cooperation, trust and shared vision among the yacht building firms. The corresponding average scores for the three dimensions of the scale were 2.99±0.55 for internal human resource mobility, 3.48±0.76 for shared vision and 3.50±0.93 for trusting cooperation. The relatively low score for the first dimension was especially affected by the fact that the managers, workers and technicians of the firms do not have a local origin and they do not have a common academic background and training from the academic institutions of the region. This is due to the fact that 10 years ago this sector was completely new for the region and the early investors had to bring qualified workforce from earlier yacht building regions like Tuzla and Bodrum, and trained new personnel for their purposes. Currently there is a pool of managers, technicians and employees who are not of local origin, but who have gained common work experience in this region. An important factor limiting internal mobility of the workforce in the Zone was expressed during the interviews, as a gentlemen's agreement between firm owners in 2007 accepting not

to transfer employees from each other without consulting the applicant's employer. The scores for shared vision and trusting cooperation were somewhat higher and very close to each other, indicating that some of the firms have reached a resolution as to the importance of building a common reputation in the world markets, and believe that their firms' future is related to the future of the other firms in the Zone. Considerably high standard deviations for these two values indicate the views are far from being unanimous in these respects. The interview sessions demonstrated that some leading firms are trying hard to build a shared vision and collective strategy, but the state of the affairs leaves much to be desired yet. This measure, if taken as a predictor of the degree of clustering for the purposes of the present study, would indicate a medium degree of clustering properties in this region.

5.6. Independent variable 3: Intellectual capital

As explained above, innovativeness was found to be related with the intellectual capital possessed by firms [50], [51], [52] in accordance with the resource based view of the firm [46], [47], [48], [49]. H8 was formulated to test this proposed positive relationship. An intellectual capital scale developed by Kianto et al. [58] (based on previous work by Kianto [60] and Bontis [61] and several other studies) consisting of four dimensions was used to measure the intellectual capital of the firms. The average score of firms for overall intellectual capital is 4.04±0.39 on a 5- point Likert scale indicating a quite rich resource base in the Zone. The average scores of the sample firms for the four dimensions were: 1) 3.91±0.51 for human capital, 2) 4.35±0.35 for customer capital, 3) 3.83±0.73 for structural capital and 4) 4.38± 0.47 for renewal capital. The renewal capital dimension which measures the learning and renewal potential of the firms received the highest score. This can be interpreted either as a general trait adopted inevitably due to the project based high value adding nature of the business or as a requisite property developed by the Zone firms in order to survive from the 2009 world crisis. Almost all managers interviewed confirmed that their firm could be labeled as a learning organization. The second highest score was rated for customer capital which measures the degree of cooperation and trust between customers and suppliers in the region. This also indicates the significance of a strong customer focus in this sector, which needs to strongly link suppliers, contractors, yacht builders and customers for the successful completion of the yacht building projects. The human capital dimension measuring the human resource potential of the firms was also rated quite high, but remained on the third rank. Interviews also indicated that firms are no longer suffering from a serious shortage of qualified workforce as they did while the cluster was newly forming in early 2000's. The impact of recent economic crisis was mentioned as another factor that released some part of the workforce from downsizing firms. The interviews and this part of the questionnaire indicate that there still remains much to be done to develop the workforce pool in this sector.

5.7. Independent variable 4: Innovativeness & innovation resources

In order to further explore the internal competencies and resources related with innovativeness, some other measures were used in the questionnaire. One is an innovativeness scale adapted from a six-item scale used by Calantone et.al [57] to measure the innovation capability of the firms. The adapted scale consists of five items rated on a 5-point Likert scale, questioning the propensity of the firm for searching new solutions, adopting new ways of doing things and giving prominence to creativity. The firms in our sample scored quite high on this variable. The average score for 16 firms was 4.45, ranging between 3.6 and 5 with a standard deviation of 0.40. During the interviews the respondents frequently stressed the fact that in the yacht building sector innovativeness was a requisite for competitiveness and survival. Each boat built was a unique project and each demanded new and innovative solutions at every phase of manufacturing. Therefore people in this sector had no other chance than being open to novelty. This finding appears somewhat incoherent with the mediocre scores of innovation performance of the same

firms, confirming the views of the innovation systems approach [37], [38] which asserts that internal resources, and in that connection innovativeness by itself cannot determine introduction of an innovation.

As control variables, innovation resources were measured by the ratio of number of full time engineers plus architects plus technical personnel plus R&D personnel (labeled as total technical human resources) to the total number of employees of the firm. The average ratio was 0.21 ranging between 0.07 and 0.75. Only three firms have 1 or 2 full-time R&D personnel, and one firm conducts R&D in alliance with its design consulting firm. As emphasized by Varis & Littunen [38] R&D potential or intensity can not be considered an absolute measure of a firm's prospects for innovation performance, but the "existence of skilled and technically qualified workforce and also its continuous training" can be "more important than conducting pure R&D". These factors determine the absorptive capacity [62] of the firm in making use of internal and external information for creating new knowledge. The intellectual capital scale explained above can be taken as a relevant and reliable measure of this absorptive capacity.

5.8. Independent variable 5: Business and information sharing networks

In accordance with the hypothesis (H2) that the total size of the knowledge sharing networks perceived as source of information will have a positive impact on their innovativeness, and the hypothesis (H3) that the total size of global linkages will have a positive impact on innovativeness as indicated by the findings of studies by Armatlı-Köroğlu [39] and Eraydın and Armatlı-Köroğlu [41], the authors have developed a scale that inquires the total size of all the multi-level (local-national-global) business/information sharing and strategic alliance relationships of the firms. The items of the scale were specially prepared to fit the sector, including all types of potential network actors grouped in four categories: Actors supporting production (suppliers and outsourcing contractors), service providers (all sorts of consulting), marketing agents and information providers (competing firms, friends, public and non governmental organizations). The respondents were asked to fill in the number of network actors they are affiliated with for each functional area (24 items) in the corresponding level, and indicate the strength of linkage with these actors by also filling the columns that indicates the numbers of actors in that category accepted as a source of information for the firm; and on the third column the numbers of actors which are seen as a strategic partners. The strategic partnerships were taken as a measure of strong ties, information sources were taken as weak ties.

In the final, research project data will be analyzed to test the hypothesis that strong in-cluster (local) relations will predominantly be with the outsourcing firms (H4) and service providers (H5), while the global strong relations will predominantly be with the suppliers (H6) and marketing actors (H7). The findings of the present pilot study summarized in Exhibit 1 indicate that the average size of total multi-level networks for 15 firms (one newly founded was excluded from the analysis) is 209.27, 42% of which is comprised of global linkages, and 39% national linkages, local ties remaining at 19%. The average size of total multi-level linkages seen as a source of information is 173.60, 40% of which is national, another 40% global and the remaining 20% local. Similar ratios were found for the network relations accepted as strategic alliances. The average size of total strategic alliance linkages is 50.2, composed of 17% local, 44% national and 38% global ties. When checked in relation to H4 and H5, the findings demonstrated that the ratio of local outsourcing firms accepted as strategic alliances to the total size of strategic alliances was only 14% and the same ratio for local service providers was only 8 % indicating very low levels of local strong ties. When a similar analysis is carried on for global suppliers and global marketing actors (ratio of global suppliers/ global marketing actors to the total size of global strategic alliances) the ratios are 0.48 and 0.26 respectively. These findings indicate the significance of global suppliers and global marketing actors for the yacht building business. In the final research project H6 and H7 can be combined in one single hypothesis proposing that "global strong relations will predominantly be with global

suppliers and marketing actors". The overall findings of this study strongly indicate that local linkages remain below 20% for each main category, national and global linkages comprising almost equal shares, sometimes global, sometimes national ones scoring slightly higher.

Table 1. Descriptive statistics for dependent and independent variables

DEPENDENT VARIABLES	Mean		Sd
Innovation (product/process/marketing/organization) performance	**2.13**		**1.19**
Business Performance			
-Total satisfaction with 8 performance criteria	3.08		0.76
-Satisfaction with general performance	3.73		0.88
INDEPENDENT VARIABLES			
Relational Capital	**3.32**		**0.57**
-Internal human resource mobility	2.99		0.55
-Shared Vision	3.48		0.76
-Trusting Cooperation	3.50		0.93
Intellectual Capital	**4.04**		**0.39**
-Human Capital	3.91		0.51
-Customer Capital	4.35		0.35
-Structural capital	3.83		0.73
-Renewal capital	4.38		0.47
Innovativeness	**4.45**		**1.19**
Innovation Resources			
-Average number of technical human resources (engineers, architects, technicians and R&D employees)	8.33		
-Ratio of technical personnel / total number of employees	0.21		
Business and information sharing networks		**%**	
Total size of multi-level networks	**209.27**	**1.00**	**213.80**
-Total size of local networks	40.20	0.19	35.56
-Total size of national networks	88.13	0.42	101.32
-Total size of global networks	80.93	0.39	89.63
Total size of networks perceived as source of information	**173.60**	**1.00**	**172.19**
-Total size of local networks perceived as source of information	35.27	0.20	30.95
-Total size of national networks perceived as source of information	69.27	0.40	81.93
-Total size of global networks perceived as source information	69.07	0.40	67.96
Total size of networks accepted as strategic alliances	**50,2**	**1.00**	**85.21**
-Total size of local strategic alliances	8.60	0.17	16.00
-Total size of national strategic alliances	22.47	0.445	54.64
-Total size of global strategic alliances	19.13	0.38	21.52
Local outsourcing firms in the network	**3.47**		**3.16**
-Ratio of local outsourcing firms accepted as strategic alliances/ total size of strategic alliances	0.14		
Local service providers in the network	**4.47**		**3.80**
-Ratio of local service providers accepted as strategic alliances/ total size of strategic alliances	0.08		

Global suppliers in the network	**46.93**	**47.69**
-Ratio of global suppliers accepted as strategic alliances/ total size of global strategic alliances	0.54	
-Ratio of global suppliers in the network/ total size of supplier Networks	0.48	
Global marketing actors in the network	**16.20**	**19.55**
-Ratio of marketing actors accepted as strategic alliances/ total size of global strategic alliances	0.26	
National suppliers in the network	**38.07**	**47.58**
-Ratio of national suppliers accepted as strategic alliances/ total size of national strategic alliances	0.21	
-Ratio of national suppliers in the network/ total size of supplier Networks	0.39	

5.9. Independent variable 6: Supporting institutional environment

In accordance with the innovation systems approach [37], [38] a positive relationship is expected between powerful supporting institutional environment and innovativeness (H9). For the purposes of the pilot study, this environment was evaluated by the interview comments of the respondent managers on factors supporting or hindering the development of the sector in the region. The data compiled from these interviews indicated that the major actors perceived as shaping the institutional environment are "the state" in general (responsible for the legal framework regulating the free trade zones, providing incentives and supports, easing the bureaucratic red tape, establishing education and training institutions, investing in the infrastructure), the Free Trade Zone Directorate and The Zone Operating Company (ASBAŞ) (both expected to mediate with the government authorities for solving infrastructural, legal, bureaucratic etc. problems on behalf of yacht building firms). The dominant view among the firm managers was that the Free Zone provided a proper infrastructure, some incentives and a regulated environment for doing business, but the red tape of doing business sometimes took away all the advantages; the state was in no way supporting the sector, but during the recent years the local zone authorities were trying their best to solve the problems of the yacht building sector, to find solutions to the slipway construction, improve infrastructure, ease the bureaucratic hurdles, coordinate the joint marketing efforts etc. Besides these there is no financial support from the banking system in Turkey which does not possess the expertise to evaluate the risks and costs of providing credits to the yacht building sector.

5.10. Independent variable 7: Markets served

Additionally, a positive relation is hypothesized between the global linkages of firms serving external markets and firm innovativeness (H10). All the firms in the present sample are serving external markets. Only two firms are also engaged in national military projects. The data available was not sufficient to make predictions about this hypothesis.

6. Conclusion

In this pilot study the researchers were able to test the clarity and conformity of the data collection tools with the objectives of the research project, in one of the major yacht building clusters of Turkey. The sample consisted of the major yacht building firms currently in business at the AFZ. The questionnaires were filled face to face after the semi-structured interviews with the respondent managers in charge of firm operations. Minor modifications were made on the questionnaire depending on the feedback from respondents. The data obtained from this study also provided a general idea about the hypotheses to be tested, and the final model of the study. Moreover the general profile of the sample firms regarding the innovation performance, business performance, innovativeness, innovation resources,

intellectual capital, relational capital, business and information sharing networks, supportive institutional environment and markets served could be depicted. This profile demonstrated that the yacht building firms in the sample scored quite high in intellectual capital (4.04) and innovativeness (4.45), relatively low in innovation performance (2.13 out of 4), somewhat modest in relational capital (3.32) and total satisfaction with performance (3.08). These findings are in conformance with the presumptions of the institutional systems approach, suggesting that innovation performance is dependent on a number of factors related with the institutional context, other than internal resources and capabilities of the firms. The relatively low innovation performance could be linked with the modest level of relational capital and modest level in the supporting institutional environment. The findings of the network analysis, which demonstrated that the Zone firms relied heavily on national and global networks as information sources and strategic alliances may support this assumption by indicating that local networks with suppliers and service providers remain quite limited. The only functional area that local networks outnumber national and global ones is the field of outsourcing contractors, 68 percent of which are of local origin.

The sample of the study was too small to carry out the tests of the hypotheses proposed for our research project. This represents the main limitation of this study, which will be compensated as the field study is completed in other yacht building regions of Turkey.

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